

## CLAIMS

**Please amend the claims as follows:**

1. (currently amended) A method of operating a data processing system, said method comprising:  
establishing one or more monitoring parameter sets in an integrated circuit processing unit within the data processing system, wherein the one or more monitoring parameter sets indicate one or more criteria by which software entities will be monitored;

the integrated circuit processing unit monitoring, in hardware, execution of each of a plurality of schedulable software entities within the integrated circuit processing unit in accordance with a monitoring parameter set among the one or more monitoring parameter sets; and

the integrated circuit processing unit reporting to management software executing in the data processing system utilization of hardware resources of the data processing system by each of the plurality of schedulable software entities.

2. (currently amended) The method of Claim 1, wherein said establishing a monitoring parameter set comprises the integrated circuit processing unit receiving said monitoring parameter set from said management software and storing said monitoring parameter set in said integrated circuit processing unit.

3. (currently amended) The method of Claim 1, wherein said reporting comprises said integrated circuit processing unit interrupting said management software.

4. (currently amended) The method of Claim 1, wherein establishing a monitoring parameter set comprises receiving, from software, information identifying an instruction type to be detected when processed by the integrated circuit processing unit and a number of instructions to be detected of the instruction type.

5. (currently amended) The method of Claim 1, wherein:  
the management software comprises an operating system;

the method further comprises the operating system scheduling one or more schedulable software entities for execution within the integrated circuit processing unit in accordance with the utilization of hardware resources by each of the plurality of schedulable software entities reported by the integrated circuit processing unit.

6. (currently amended) The method of Claim 1, and further comprising:

the management software generating a respective classification of each of the plurality of schedulable software entities; and

the management software storing the classifications in classification storage in the integrated circuit processing unit in association with identifiers of the respective schedulable software entities.

7. (currently amended) The method of Claim 6, wherein:

the management software comprises an operating system; and

the method further comprises the operating system scheduling the one more schedulable software entities by reference to the stored classifications.

8. (currently amended) The method of Claim 6, and further comprising:

the management software communicating to the integrated circuit processing unit a classification of at least one executing schedulable software entity; and

in response to receipt of the classification by the integrated circuit processing unit, the integrated circuit processing unit dynamically modifying an allocation of hardware resources of the data processing system to the schedulable software entity.

9. (currently amended) The method of Claim 8, wherein:

the schedulable software entity is a first schedulable software entity;

said method further includes the integrated circuit processing unit concurrently executing instructions within the first schedulable software entity and a second schedulable software entity; and

modifying an allocation of resources includes increasing an allocation to said second schedulable software entity of a hardware resource shared by said first and said second schedulable software entities.

10. (currently amended) A data processing system, comprising:

data storage;

one or more integrated circuit processing units coupled to said data storage, wherein an integrated circuit processing unit among said one or more integrated circuit processing units includes:

one or more execution units that execute instructions;

instruction fetch and dispatch circuitry that supplies instructions to said one or more execution units for execution;

storage for one or more monitoring parameter sets that indicate one or more criteria by which software entities will be monitored; and

a hardware monitor that, responsive to the one or more monitoring parameter sets, monitors, in hardware, execution of each of a plurality of schedulable software entities within the integrated circuit processing unit in accordance with a monitoring parameter set among the one or more monitoring parameter sets and reports to management software executing in the data processing system utilization of hardware resources of the data processing system by each of the plurality of schedulable software entities.

11. (currently amended) The data processing system of Claim 10, ~~wherein said hardware monitor includes storage for the one or more monitoring parameter sets, and~~ wherein the hardware monitor stores at least one monitoring parameter set within the storage for the one or more monitoring parameter sets in response to receipt of said monitoring parameter set from said management software.

12. (currently amended) The data processing system of Claim 10, wherein said hardware monitor reports said utilization of hardware resources by interrupting said management software.

13. (currently amended) The data processing system of Claim 10, wherein at least one of said one or more monitoring parameter sets comprises information identifying an instruction type to be detected

when processed by the integrated circuit processing unit and a number of instructions to be detected of the instruction type.

14. (currently amended) The data processing system of Claim 10, wherein:

the management software includes an operating system;

said data processing system further includes the operating system ~~software~~ within the data storage; and

the operating system schedules one or more schedulable software entities for execution within the integrated circuit processing unit in accordance with the utilization of hardware resources by each of the plurality of schedulable software entities reported by the integrated circuit processing unit.

15. (currently amended) The data processing system of Claim 10, ~~wherein and further comprising:~~

the integrated circuit processing unit includes classification storage; and

the data processing system further comprises the management software, wherein the management software is stored within the data storage, and wherein the management software generates a respective classification of each of the plurality of schedulable software entities and stores the classifications in the classification storage of the integrated circuit processing unit in association with identifiers of the respective schedulable software entities.

16. (currently amended) The data processing system of Claim 15, wherein:

the management software comprises an operating system; and

the operating system schedules the one more schedulable software entities by reference to the stored classifications.

17. (currently amended) The data processing system of Claim 15, wherein:

the management software communicates to the integrated circuit processing unit a classification of at least one executing schedulable software entity; and

the integrated circuit processing unit includes a resource manager that, responsive to receipt of the classification by the integrated circuit processing unit, dynamically modifies an allocation of hardware resources of the data processing system to the schedulable software entity.

18. (currently amended) The data processing system of Claim 17, wherein:

the schedulable software entity is a first schedulable software entity;

the integrated circuit processing unit concurrently executes instructions within the first schedulable software entity and a second schedulable software entity; and

the resource manager modifies an allocation of resources by increasing an allocation to said second schedulable software entity of a hardware resource shared by said first and said second schedulable software entities.

19. (currently amended) An integrated circuit processing unit for a data processing system, said integrated circuit processing unit comprising:

one or more execution units that execute instructions;

instruction fetch and dispatch circuitry that supplies instructions to said one or more execution units for execution; and

storage for one or more monitoring parameter sets that indicate one or more criteria by which software entities will be monitored; and

a hardware monitor that, responsive to the one or more monitoring parameter sets, monitors, in hardware, execution of each of a plurality of schedulable software entities within the integrated circuit processing unit in accordance with a monitoring parameter set among the one or more monitoring parameter sets and reports to management software executing in the data processing system utilization of hardware resources of the data processing system by each of the plurality of schedulable software entities.

20. (currently amended) The integrated circuit processing unit of Claim 19, ~~wherein said hardware monitor includes storage for the one more monitoring parameter sets, and~~ wherein hardware monitor stores at least one monitoring parameter set within the storage for the one or more monitoring

parameter sets in response to receipt of said monitoring parameter set from said management software.

21. (currently amended) The integrated circuit processing unit of Claim 19, wherein said hardware monitor reports said utilization of hardware resources by interrupting said management software.

22. (currently amended) The integrated circuit processing unit of Claim 19, wherein at least one of said one or more monitoring parameter sets comprises information identifying an instruction type to be detected when processed by the integrated circuit processing unit and a number of instructions to be detected of the instruction type.